

providing a substrate on a substrate holder in a vacuum atmosphere within a CVD apparatus;

heating said substrate at a temperature range;

introducing a feedstock gas having a high temperature-melting point metal in its structure,
and a reductive nitrogen-containing gas comprising a nitrogen atom into said vacuum atmosphere;

and

forming a film of the nitride of said high temperature-melting point metal on said substrate,
wherein a nitrogen-free auxiliary reductive gas is introduced into said vacuum atmosphere.

3. (Twice Amended) The process for producing a barrier film by the heat CVD method,
comprising the steps of:

providing a substrate on a substrate holder in a vacuum atmosphere within a CVD apparatus;

heating said substrate at a temperature range;

introducing a feedstock gas having a high temperature-melting point metal in its structure
into said vacuum atmosphere; and

forming a film of the nitride of said high temperature-melting point metal on said substrate,

wherein a nitrogen-free auxiliary reductive gas is introduced into said vacuum atmosphere,
said nitrogen-free auxiliary reductive gas being introduced together with said feedstock gas into said
vacuum atmosphere.

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D.3

8. (Twice Amended) A process for producing a barrier film by a heat CVD method for forming a barrier film made of a film of the nitride of a high temperature-melting point metal on a substrate on a substrate holder in a vacuum atmosphere within a CVD apparatus, comprising the steps of exposing the surface of said substrate to a plasma of hydrogen gas and a plasma containing at least one gas selected from among argon, nitrogen and helium gases; and then forming the film of the nitride of said high temperature-melting point metal on the surface of the substrate, wherein the step of forming the film includes the steps of heating the substrate at a temperature range.

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11. (Amended) A process for producing a barrier film which comprises the steps of:
providing a substrate on a substrate holder in a vacuum atmosphere within a CVD apparatus;
heating said substrate at a temperature range;
introducing a feedstock gas having a high temperature-melting point metal in its structure,
and a NH_3 gas into said vacuum atmosphere; and
forming a film of the nitride of said high temperature-melting point metal on said substrate,
wherein a reductive Si-containing gas is introduced into said vacuum atmosphere.

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13. (Amended) The process for producing a barrier film, comprising the steps of:
providing a substrate on a substrate holder in a vacuum atmosphere within a CVD apparatus;
heating said substrate at a temperature range;
introducing a feedstock gas having a high temperature-melting point metal in its structure

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into said vacuum atmosphere; and

forming a film of the nitride of said high temperature-melting point metal on said substrate,

wherein a reductive Si-containing gas is introduced into said vacuum atmosphere, said

reductive Si-containing gas being introduced together with said feedstock gas into said vacuum atmosphere.

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Si
0.5
Si